AMENDMENTS TO THE CLAIMS

1. – 31. (Canceled)

32. (Currently Amended) A microfluidic system comprising a microchannel and a pump, ~~arranged to cause fluid in said microchannel to flow under the action of secondary electroosmosis~~ the pump comprising at least one conductive member disposed in said microchannel or forming at least a part of a wall of said microchannel, the system having electrodes positioned on respective sides of said conductive member so as to apply an electric field to said member, the conductive member having a specific geometrical shape so as to provide in the microchannel a surface of the member wherein the normal to the surface has a component parallel to and a component perpendicular to the direction of the electric field in said microchannel, such as to cause fluid in said microchannel to flow under the action of secondary electroosmosis, and wherein the conductive member comprises a perm selective ion conducting material.

33. (Canceled)

34. (Currently Amended) The system as claimed in ~~claim 33~~claim 32, wherein the system is a fluid network formed in a substrate, the at least one ~~electrically~~ conductive member being disposed in a segment of said microchannel and the electrodes being positioned to apply an electric field across the segment, and wherein the space between the ~~electrically~~ conductive member and the walls of the microchannel, and between different ~~electrically~~ conductive members, is between 0 a_{char} and 2 a_{char}, the surface of the at least one ~~electrically~~ conductive member being smooth such that the surface irregularities are less than 5% of d_{char}.

35. (Currently Amended) The system as claimed in claim 34, wherein the space between the ~~electrically~~ conducting member and the channel walls, and between different ~~electrically~~

conducting members, is between 1/8 a_{char} and ½ a_{char}, and wherein the surface irregularities are less than 1% of d_{char}.

36. (Currently Amended) The system as claimed in claim 34, wherein the at least one ~~electrically~~ conducting member the shape of an ellipsoid, sphere, ~~cylinder,~~ cylinder or elliptical cylinder ~~or pone~~.

37. (Currently Amended) The system as claimed in claim 34, wherein the at least one ~~electrically~~ conducting member consists of a small cylinder with the longitudinal axis normal with respect to the fluid flow direction.

38. (Currently Amended) The system as claimed in claim 34, wherein the at least one ~~electrically~~ conducting member has the shape of a particle with planes which are inclined with respect to the imposed electric field.

39. (Previously Presented) The system as claimed in claim 38, wherein the particle constituting the electrically conducting member has a size of 0.1 μm - 5 mm, measured in parallel to the externally imposed electric field.

40. (Currently Amended) The system as claimed in claim 39, wherein the particle constituting the ~~electrically~~ conducting member has a size of 1.0 μm to 500 μm measured in parallel to the externally imposed electric field.

41. (Previously Presented) The system as claimed in claim 38, wherein the angle λ between the inclined surface portion and the microchannel walls is 1- 80 degrees.

42. (Previously Presented) The system claimed in claim 41, wherein, the angle λ between the inclined surface portion and the microchannel walls is 30 - 60 degrees.

43. (Currently Amended) The system claimed in claim 34, wherein the ~~electrically~~ conducting member contains several layers of conducting particles, spaced both axially and longitudinally in relation to the flow direction.

44. - 46. (Canceled)

47. (Currently Amended) The system claimed in claim 34, wherein the ~~electrically~~ conducting member has a conductivity of at least 5 times the conductivity of said fluid.

48. (Currently Amended) The system claimed in claim 47 wherein the ~~electrically~~ conducting member has a conductivity of at least 10 times the conductivity of said fluid.

49. (Currently Amended) The system as claimed in claim 34, wherein the ~~electrical connection means contains a pair of~~ electrodes are arranged upstream or downstream with respect to the microchannel segment.

50. (Currently Amended) The system as claimed in claim 34, wherein ~~the electrical connection means is~~ electrodes are adapted to provide an electrical field parallel to the direction of the transported fluid.

51. (Currently Amended) The system as claimed in claim 34, wherein the ~~electrical connection means (16) applies~~ electrodes are arranged to apply an alternating field.

52. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field which has sine, square, triangular or sawtooth shape, or a combination of said shapes.

53. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field where the signal has an offset resulting in a strong and a weak pulse within the signal period, and also a duty - cycle of

29%, so that the strong pulse lasts 29% of the signal period, and where the offset and duty cycle are tuned to give a zero average direct electric signal component.

54. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field where the signal has an overloaded direct component.

55. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field where the electric signal is applied in the potentiostatic regime.

56. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field with a maximum amplitude in V/mm equal to or larger than an amplitude for which the base -10- logarithm is the linear interval between -2 and 2, for corresponding a_{char}, measured in µm, for which the base -10- logarithm is in the linear interval between 0 and 3.7.

57. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply~~electrical connection means applies~~ an alternating field with a signal period in seconds equal to or larger than a period for which the base -10 - logarithm is in the linear interval between -6 and zero, for corresponding a_{char}, measured in µm, for which the base -10 - logarithm is in the linear interval between 0 and 3.

58. (Currently Amended) The system as claimed in claim 34, wherein the electrodes are arranged to apply ~~electrical connection means applies~~ a direct electric field.

59. (Currently Amended) The system as claimed in claim 34, wherein the distance between each ~~electrical connection means~~ electrode and the ~~electrically~~ conducting member is between 0.1 and 5 mm.

60. (Currently Amended) The system as claimed in claim 34, wherein the ~~electrical connection means contains~~ electrodes comprise four electrodes, a first pair of electrodes for inducing the SCR, and a second pair of electrodes for setting ions in the fluid in motion.

61. (Previously Presented) The system as claimed in claim 60, wherein a first pair of electrodes is arranged upstream or downstream of said segment of the microchannel, anywhere in the microchannel or microfluidic system, and wherein the second pair of electrodes is positioned on each side of said segment.

62. (Previously Presented) The system as claimed in claim 60, wherein the first pair of electrodes and the second pair of electrodes each applies an alternating electric field, where the two electric fields are out of phase.

63. (Currently Amended) The system as claimed in claim 34, wherein the ~~electrically~~ conducting member is a portion of the microchannel wall effecting a deflection of the local electrical field so that the field is inclined with respect to the ~~electrically~~ conducting member.

64. (Previously Presented) The system as claimed in claim 32, arranged to act as a micropump.

65. (Previously Presented) The system as claimed in claim 32, arranged to act as a mixer.

66. (Previously Presented) The system as claimed in claim 32, arranged to provide drug delivery.

67. (Previously Presented) The system as claimed in claim 64, wherein the system is part of a lab-on-a chip assembly.

68. (Previously Presented) The system as claimed in claim 64, arranged to provide electronics cooling.

69. (Currently Amended) A method for pumping fluid in a microchannel comprising the step of applying an electric field to a conductive member ~~in said microchannel sufficient to cause fluid in said microchannel to flow as a result of secondary electroosmosis~~which is disposed in said microchannel or which forms at least a part of a wall of said microchannel, the conductive member comprising a perm selective ion conducting material, and the conductive member having a specific geometrical shape so as to provide in the microchannel a surface of the member wherein the normal to the surface has a component parallel to and a component perpendicular to the direction of the electric field in said microchannel, to cause fluid in said microchannel to flow as a result of secondary electroosmosis.

70. (Previously Presented) The method as claimed in claim 69, wherein said electric field is an asymmetric alternating field.

71. (Previously Presented) The method as claimed in claim 70, wherein, with one polarity, said electric field is insufficient to cause fluid to flow as a result of secondary electroosmosis.

72. (Previously Presented) The method as claimed in claim 71, wherein a time integral of said electric field is zero.

73. (Previously Presented) A method for pumping fluid in a microchannel wherein said microchannel is in a microfluidic system as claimed in claim 32.

74. (New) A microfluidic system comprising a microchannel and a pump, the pump comprising at least one conductive member disposed in said microchannel or forming at least a part of a wall of said microchannel, the system having electrodes positioned on respective sides

of said conductive member so as to apply an electric field to said member, the conductive member having a surface wherein the normal to the surface has a component parallel to and a component perpendicular to the direction of the electric field in said microchannel, such as to cause fluid in said microchannel to flow under the action of secondary electroosmosis, wherein the conductive member comprises a perm selective ion conducting material, wherein the conductive member has a characteristic dimension which is its dimension measured parallel to the electric field and which is at least 10μm, and wherein a flow passage is defined between said surface of the conductive member and another conductive member or between said surface and a portion of the wall of said microchannel, the flow passage having a minimum diameter of at least 1/16 of the characteristic dimension of the said conductive member.

75. (New) A system as claimed in claim 74, wherein the characteristic dimension of the conductive member is between 10μm and 500 μm.

76. (New) A system as claimed in claim 74, wherein the minimum diameter of the flow passage is between 1/16 and 1 times the characteristic dimension of the said conductive member.

77. (New) A system as claimed in claim 74, wherein the surface of the said conductive member is smooth such that any surface irregularities are less than 5% of the characteristic dimension thereof.

78. (New) A system as claimed in claim 74, wherein the surface of the conductive member is at an angle of between 30 and 60 degrees to the direction of the electric field.

79. (New) A system as claimed in claim 74, wherein the conductive member has a conductivity of at least 5 times that of a liquid which in use is to flow in the microfluidic system.

80. (New) A system as claimed in claim 74, wherein the microfluidic system is arranged on or in a substrate.

81. (New) A system as claimed in claim 74, wherein the distance between each electrode and the said conductive member is between 0.5 and 5 mm.

82. (New) A system as claimed in claim 74, wherein the microchannel has an inlet and an outlet, and the pump is arranged to cause fluid to flow from the inlet, along the microchannel and adjacent to said surface of the conductive member, to the outlet.

83. (New) A method for pumping fluid in a microchannel wherein said microchannel is in a microfluidic system as claimed in claim 74.

84. (New) A method as claimed in claim 83, wherein the electrodes apply an electric field E to said member, and wherein

$$E > 0.013\ V / a_{char}$$

where V is the potential drop across the characteristic dimension of the conductive member and a_{char} is 0.5 times the characteristic dimension.